

264749

Type studies of Australian species of *Inocybe* (Agaricales)

P. Brandon Matheny^a and Neale L. Bougher^b

- a. Department of Ecology and Evolutionary Biology, 332 Hesler, University of Tennessee, Knoxville, TN 37996-1610 USA; email: pmatheny@utk.edu
- b. Department of Environment and Conservation, Western Australian Herbarium, Bentley Delivery Centre, Perth, WA, Australia.

Introduction

In preparation for monographic and floristic studies of the family Inocybaceae (Agaricales, Basidiomycota) from Australia, critical evaluations of type material are required not only to clarify species concepts of original authors but also to reveal the status of characters omitted from protologues or by subsequent type studies. Re-examinations of Australian type collections that have been classified in *Inocybe* by various authors are presented here. This work includes twelve types of Cleland (Cleland and Cheel 1918; Cleland 1928; Cleland 1933), one type of Miller and Hilton (1987), and three types of Grgurinovic (1997). Although Horak (Horak 1977; 1979; 1980; 1981) described numerous species of *Inocybe* (also as *Astrosporina*, here treated as a synonym of *Inocybe*) from southeast Asia, Indonesia, Papua New Guinea, and New Zealand, no new species were described by him from Australia. Five species have been recently described in or transferred to the genus *Auritella*. See Matheny and Bougher (2006a, 2006b) for complete descriptions of these species. Because details of the type collection of *A. arenicolens* (= *Naucoria arenacolens*) were not presented separately, they are presented here.

Two species of *Inocybe* previously considered doubtful because authentic material could not be located at AD (Grgurinovic 1997) are clarified here with the recovery of Cleland's material on which the protologues were based. These recovered collections are designated as lectotypes. A key to 17 described species of Inocybaceae is provided. Documentation and description of Inocybaceae from Australia is ongoing and will yield numerous novel taxa, but a key at present should prove useful to discriminate known taxa from potentially undescribed species.

Materials and methods

Tissues were revived in 3% KOH and spores examined in both KOH and Melzer's solution using light microscopy. Line drawings were made with the assistance of a drawing tube. Basidiospores were drawn at 2000 \times . Other cells were drawn at 800 \times . Anatomical terminology such as cauloparacystidia and caulocystidioid hairs follows Kuyper (1986). Colours of microscopic features quoted in the descriptions of taxa are for

Abstract

Twenty-eight species of Inocybaceae Jülich (order Agaricales) have been described from Australia. Five are included in the genus *Auritella* Matheny & Bougher, but the remaining twenty-three are in need of evaluation in order to facilitate mycofloristic studies of Australian fungi. Of these twenty-three species, twelve are treated in *Inocybe* (Fr.) Fr., and eleven are excluded or treated as doubtful. Three species treated as synonyms in the past are considered here to be autonomous. *Inocybe cystidiocatenoto* Grgurinovic is a synonym of *I. fibrilloso* (Cleland) Grgurinovic non Peck, for which the generic placement is *Cortinarius*. *Inocybe striotula* (Cleland) Grgurinovic also belongs to *Cortinarius*. The new combination *Pholioto morongania* (Grgurinovic) Matheny & Bougher is made. *Inocybe colopedes* Matheny & Bougher is introduced as a new name for *I. discissa* Cleland, non *I. discisso* (Fr.) Quél. Five lectotypes of *Inocybe* species are designated, thirteen species are illustrated, and a key to currently accepted species of Inocybaceae from Australia is provided.

Keywords: *Inocybe*, taxonomy, lectotype, Inocybaceae

Muelleria 28(2): 87-104 (2010)



Key to described species of *Inocybaceae* accepted from Australia

- 1 Fruitbodies sequestrate with a partial stipe-columella, peridium pallid mixed with brownish areas, loculate, dark brown; basidia necropigmented, spores smooth, ovate-elliptic, $9.0\text{--}10.5 \times 5.5\text{--}6.0 \mu\text{m}$ *Auritella geoaustralis* Matheny & Bougher (see Matheny & Bougher, 2006a)
- 1: Fruitbodies agaricoid and basidia necropigmented or hyaline..... 2
- 2 Fruitbodies often short and squat in sand or sandy soil, pale brown to dark brown; spores narrowly oblong-cylindric or oblong-reniform, $10\text{--}14 \times 4.0\text{--}5.5 \mu\text{m}$, very pale brown or warm buff under a light microscope, pleurocystidia absent, cheilocystidia often elongated and cylindric, $49\text{--}92 \times 6\text{--}13 \mu\text{m}$... *Auritella arenicolens* (Cleland) Matheny & Bougher (see below, also Matheny & Bougher, 2006a)
- 2: Fruitbodies not short and squat, spores not narrowly oblong, spores generally yellowish brown or darker than above, habitat various, colour various; pleurocystidia absent or present but cheilocystidia not elongated and cylindric 3
- 3 Basidia necropigmented and pleurocystidia absent; partial veil absent, lacking marginate bulb..... 4
- 3: Basidia hyaline and pleurocystidia present as metuloids; partial veil present as a cortina, or absent if possessing a marginate bulb 6
- 4 Pileus fulvous to hazel, surface minutely velvety; cheilocystidia narrowly flexuous with obtuse apices, $35\text{--}72 \times 5\text{--}10 \mu\text{m}$, spores $8.0\text{--}9.5 \times 5.0\text{--}5.5 \mu\text{m}$, subphaseoliform, subamygdaliform to elliptic *Auritella serpentiacystis* Matheny, Trappe & Bougher (see Matheny & Bougher, 2006a)
- 4: Pileus some other colour and not minutely velvety; cheilocystidia subfusiform, sublageniform to slenderly clavate with swollen or subcapitate apices 5
- 5 Known from New South Wales, spores normally pigmented or ochraceous-tawny under a light microscope, $7.5\text{--}10.5 \times 4.0\text{--}5.5 \mu\text{m}$, elliptic, pileus light yellowish brown to light brown, stipe pallid to pale brown or coloured like pileus *Auritella dolichocystis* Matheny, Trappe & Bougher (see Matheny & Bougher, 2006a)
- 5: Known from Western Australia, spores lighter than above or ochraceous-buff under a light microscope, morphologically similar to above but differing in nLSU-rRNA and *rpb2* nucleotide sequences *Auritella chamaecephala* Matheny, O.K. Mill. & Bougher (see Matheny & Bougher, 2006a)
- 6 Spores smooth or entire in outline..... 7
- 6: Spores angular or nodulose in outline..... 13
- 7 Stipe violet, pileus with violet covering at first, later cinnamon-brown to umbrinous, odour strongly spermatic; spores elliptic and caulocystidia and caulocystidioid hairs absent *Inocybe violaceocaulis* Matheny & Bougher (see Matheny & Bougher 2005)
- 7: Violet pigments absent, odour not strongly spermatic; spores not elliptic, caulocystidia or caulocystidioid hairs present....8
- 8 Pileus brown or umbrinous, matted fibrillose-squamulose, stipe coarsely pubescent with tufts of minute fibrils, not pruinose; pleurocystidia quite long between $70\text{--}110 \mu\text{m}$, spores $8.5\text{--}10.5 \mu\text{m} \times 5.0\text{--}6.0 \mu\text{m}$ *Inocybe fibrillosibrunnea* Miller & Hilton
- 8: Pileus colour various, surface texture various, stipe pruinose entire length or at apex; pleurocystidia $<80 \mu\text{m}$ long, spores of various dimensions..... 9
- 9 Centre of pileus squarrose-scaly to imbricate-scaly, dark brown to almost black, at least upper half of stipe pruinose; spores elliptic to ovate, short, $6.5\text{--}7.5 \times 4.0\text{--}5.0 \mu\text{m}$ *Inocybe australlensis* Cleland & Cheel
- 9: Pileus not squarrose-scaly, colour and stipe covering various; spores as above or larger..... 10
- 10 Pileus brown or tawny-olive, stipe with pink or pinkish-cinnamon tones; spores $6.5\text{--}7.5 \times 4.0\text{--}5.0 \mu\text{m}$ *Inocybe fulvo-olivacea* Cleland
- 10: Pileus reddish brown to dark umbrinous, cinnamon brown, or yellowish brown to dark yellowish brown, stipe warm buff or lacking pink tones, or spores larger than above..... 11
- 11 Spores $10.0\text{--}11.0 \times 5.0\text{--}5.0 \mu\text{m}$, pileus cinnamon brown to amber brown, stipe similarly coloured to pileus *Inocybe murrayana* Cleland
- 11: Spores $<10.0 \mu\text{m}$ long, pileus and stipe variously coloured 12

- 12 Pileus dark brown to brown or umbrinous *Inocybe granulosisipes* Cleland
 12: Pileus pale brown *Inocybe serrata* Cleland
 13 Base of stipe marginate or weakly so 14
 13: Stipe even or swollen at base, but not with a marginate bulb 15
 14 Pileus reddish brown, rimose, lamellae almost free, stipe longer than pileus diameter; spores
 9.0–10.5 × 6.5–7.5 µm with 9–10 prominent nodules *Inocybe calopedes* Matheny & Bougher
 14: Pileus pale yellowish brown, not rimose, lamellae attached, stipe short in relation to pileus diameter;
 spores 8.5–10 × 5.0–6.0 µm with 7–9 indistinct nodules or corners about an angular outline, the ventral
 side of which is often concave *Inocybe emergens* (Cleland) Grgurinovic
 15 Caulocystidia descending entire length of stipe; pileus cinnamon-brown, stipe white; spores 8.0–10.5 ×
 6.0–7.0 µm with 9–13 moderate to prominently size nodules *Inocybe exigua* (Cleland) Grgurinovic
 15: Caulocystidia restricted to stipe apex or not observed 16
 16 Pileus dark brown, shaggy squamulose; stipe pale brown, not stout, fibrillose; spores 9.5–11.0 × 5.5–6.5 µm,
 oblong-angular with 5–8 inconspicuous nodules or corners; metuloid caulocystidia not
 observed *Inocybe imbricata* (Cleland) Garrido
 16: Pileus golden brown, rimose; stipe stout, striate, with pale brown tint; spores 9.0–11.5 × 6.5–8.0 µm,
 gibbous with 9–12 small nodules but others irregularly angular to subelliptic in outline with 7–9 indistinct
 nodules or corners; metuloid caulocystidia present at stipe apex *Inocybe dewrangia* Grgurinovic

material mounted in KOH unless indicated otherwise. Microscopic descriptions are our own, except for dimensions reported in Cleland's protologues or where cited from literature sources.

Herbarium abbreviations are made according to Holmgren *et al.* (1990). Colour references to spores under the microscope were made with Ridgway (1912) and/or Munsell Soil Color Charts (1954).

Original Latin diagnoses by Cleland are included because they can be necessary to clarify species concepts based on heterogeneous collections.

Taxonomy

1. *Auritella arenicolens* (Cleland) Matheny & Bougher, *Mycotaxon* 97: 232 (2006)

Naucoria arenacolens Cleland, *Trans. Roy. Soc. S. Aust.* 57: 193 (1933); *Inocybe arenacolens* (Cleland) Horak, *Persoonia* 11: 6 (1980); *Auritella arenicolens* (Cleland) Matheny & Bougher, *nom. inval.* Art. 43.1

[Protologue] *Pileus* 2.5–4.4 cm, *convexus, deinde expansus, subirregularis, innato-fibrillosus, "Sayal Brown". Lamellae sinuatae, subconfertae, perventricosae, 3–5 mm latae, marginibus pallidioribus et minute serratis, tabacino-brunneae. Stipes 2.5–3.7 cm, subcrassus (8–10 mm), aequalis, fibrillosus, solidus, subcarneo-alutaceo-pallidus. Sporae pallido-brunneae, elongatae, 9.5–13 × 4 µm. Encounter Bay, South Australia, May.*

Basidiospores (10.0–) 11.0–14.0 × 4.0–4.5 (–5.0) µm, smooth, oblong-elliptic or narrowly cylindrical with a suprahilar depression, pale yellowish brown in KOH or "Warm Buff" to "Chamois", unchanging colour in Melzer's solution, ± thin-walled, germ pore absent, apiculus indistinct. *Basidia* 42–57 × 7–10 µm, 4-sterigmate, slenderly subclavate, ochraceous to hyaline. *Pleurocystidia* absent. *Cheilocystidia* 47–108 × 8–14 µm, cylindrical or slenderly subclavate, thin-walled, ochraceous to hyaline. *Caulocystidia* absent. *Lamellar trama* regular, ochraceous in mass, hyphae cylindrical, up to 10 µm broad, dark ochraceous refractive hyphae present. *Pileipellis* not studied. *Clamps* present.

Specimens examined: SOUTH AUSTRALIA. Lectotype, Encounter Bay, Waitpinga Road, emerging from sandy soil, 27.v.1932, J.B. Cleland (AD 12222); Encounter Bay, in sand, 27.v.1933, J.B. Cleland (AD 12261); Encounter Bay, in sand, 22.v.1930, J.B. Cleland (AD 12262).

Notes: Additional collections of *A. arenicolens*—note correction in spelling of the specific epithet (Matheny and Bougher 2006b)—have been cited from Western Australia and a composite description has been produced (Matheny and Bougher 2006a). Variation in spore size has also been observed, which should prompt DNA-based comparisons between collections. Species of *Auritella* can be distinguished from species of *Inocybe* by the following combination

of characters: somber brown colours, distinctly fimbriate lamellar edges, presence of necropigmented basidia, long cheilocystidia (often longer than 50 μm), non-rimose pileus, lack of reddening context, Gondwanan geographic distribution (India, Africa, and Australia, Matheny and Pradeep, unpublished), and unique phylogenetic placement (Matheny *et al.* 2009).

2. *Inocybe australiensis* Cleland & Cheel, *Trans. Roy. Soc. S. Aust.* 42: 109 (1918)

[Protologue] *Pileus ad 1.5 cm latus, convexus, interdum paulo umbonatus, squamis subnigris fibrosis vestitus. Lamellae adnexae, confertae, cinnamoneae vel atro-fuscae. Stipes 3 cm altus, pallido-fuscus aut fuscus, sursum farinosus, non tubulosus, base minime bulbosa. Sporae fuscae, glabrae, obliquae, 6–7 \times 4–5 μm . Cystidia ventricosa vel angusto-ventricosa, 50–70 \times 10.5, 42 \times 8.5 μm . Neutral Bay, Sydney, New South Wales, May.*

Basidiospores 6.5–7.5 \times 4.0–5.0 μm (n=20), smooth, elliptic to ovate with rounded apices, occasionally subamygdaliform, with slightly thick wall, apiculus small but distinct, yellowish brown. *Basidia* 25–27 \times 6 μm , hyaline, collapsed. *Pleurocystidia* 47–60 \times 12–14 μm , fusiform, thick-walled, walls 2.5–4.0 μm thick, pale yellow, necks developed or not, often merely tapered upwards and below from a central ventricose portion; apices obtuse, at times bearing crystals. *Cheilocystidia* not studied. *Caulocystidia* mostly larger than pleurocystidia, 72–85 \times 16–22 μm , and often lageniform, descending to centre of stipe with cauloparacystidia; base of stipe with caulocystidioid hairs, cauloparacystidia not observed. *Pileipellis* composed of broad fascicles of trichodermial hyphae that are “Tawny” in mass, pigment dissolves in KOH, hyphae thin-walled to slightly thickened, cylindrical to inflated, up to 18 μm diam, incrusting pigments not evident in KOH. *Clamps* present. Fig. 1.

Specimens examined: NEW SOUTH WALES. Lectotype here designated, Neutral Bay, 9 May 1915, *J.B. Cleland* (AD 5455); Sydney, Chatswood, 21.v.1916, *J.B. Cleland* (AD 5456) (watercolour 96 by Miss Clarke, not seen by us); Sydney, no date but “pre-1920” written on the packet, *J.B. Cleland* (AD 5457) (not cited in protologue).

Notes: The microscopic study is in agreement with Horak (1980). However, contrary to Horak *Inocybe australiensis* is not synonymous with *I. serrata* Cleland

and *I. granulospes* Cleland based on comparison of gross morphological characters. The original diagnoses are repeated to emphasise this point. *Inocybe australiensis* is distinguished by its squarrose dark brown pileus (similar to *I. lanuginosa*), upper half of the stipe that is pruinose, and small elliptic spores. The lower part of the stipe is fibrillose based on the presence of dense superficial fibrils there. Unfortunately, no data exist on the habitat associated with this species originally described from New South Wales. Similar species include *I. phaeosquarrosa* Horak from New Zealand, which differs by the scaly stipe and thin-walled cystidia; and *I. umbrosa* Horak, which has a red brown pruinose stipe and amygdaliform shaped spores.

The name *Inocybe australiensis* has been misapplied to collections of *I. serrata* and closely related species by Grgurinovic (1997) and Bougher and Syme (1998). It is not known at this time from Western Australia.

The description in the protologue is almost drawn entirely from AD 5455 incorporating minor aspects of AD 5456. AD 5457, which is not referred to in the protologue, is conspecific.

3. *Inocybe calopedes* Matheny & Bougher, *nom. nov.*

Inocybe discissa (Cleland) Grgurinovic, *Larger Fungi of S. Aust.* 182 (1997), non *Inocybe discissa* (Fr.) Quél. (1872); *Astrosporina discissa* Cleland, *Trans. Roy. Soc. S. Aust.* 57: 192 (1933).

[Protologue] *Pileus 2.5 cm, convexus, umbonatus, perfibrillosus, discissus, brunneus. Lamellae liberae, ventricosae, brunneae. Stipes 2.5 cm, subtenuis, primitus subpruinosis deinde glaber, aequalis, ad basim subbulbous, albidus vel pallido-brunneus. Sporae nodosae, brunneae, 9 \times 6 μm . Upper Tunkalilla Creek, South Australia, June.*

Basidiospores (8.5–) 9.0–10.5 (–11.0) \times 6.5–7.5 μm (n=20), gibbous with mostly 9–10 prominent obtusely conic nodules around a polygonal outline, saddle-shaped nodules rare, with distinct apiculus, yellowish brown, not reacting in Melzer’s. *Basidia* 23–28 \times 9–10 μm , 4-sterigmate, clavate to cylindrico-clavate, hyaline. *Pleurocystidia* 49–58 \times 16–25 μm , fusiform to utriform, thick-walled, walls 2.0–4.0 μm thick, hyaline

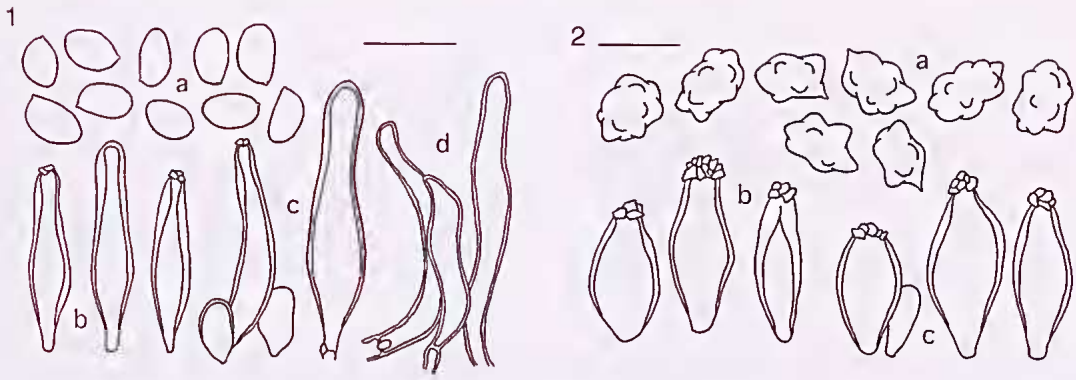


Figure 1: *Inocybe australiensis* (AD5455, lectotype): a. spores; b. pleurocystidia; c. caulocystidia from stipe apex; d. caulocystidioid hairs above stipe base. Scale bar = 10 µm for spores, 25 µm for other cells.

Figure 2: *Inocybe calopedes* (AD12230, holotype of *Astrosporino discisso*): a. spores; b. pleurocystidia; c. caulocystidia from throughout the stipe. Scale bar = 10 µm for spores, 25 µm for other cells.

or pale yellowish, with or without a short neck, tapering below to a short pedicel or sessile; apices obtuse, crystalliferous; not frequent. *Cheilocystidia* similar to pleurocystidia although usually shorter, also clavate, infrequent. *Caulocystidia* similar to pleurocystidia though often more ventricose or rounded, descending entire length of stipe, in clusters mixed with cauloparacystidia down to centre of stipe; less frequent below and usually subelliptic to broadly clavate and thin- or slightly thick-walled. *Lamellar trama* regular, pale yellowish brown in mass, hyphae cylindrical to inflated, up to 23 µm diam. *Pileipellis* a cutis of light reddish brown pigmented hyphae in mass, surmounted by a sparse irregular layer of narrowly cylindrical, hyaline hyphae. *Clamps* present. Fig. 2.

Specimens examined: **SOUTH AUSTRALIA.** Holotype, Upper Tunkallilla Creek, 4.vi.1930, J.B. Cleland (AD 12230). **TASMANIA.** I2, Myrtle Gully, 9.xi.2000, G. Gotes & D. Rotkowsky, pers. herb. G. Gotes; I100 Myrtle Gully, 16.xi.2006, G. Gotes & D. Rotkowsky, pers. herb. G. Gotes. **WESTERN AUSTRALIA:** E6735 (=PBM2118), just outside William Bay National Park, near Lake Byleveld, 15 km from Denmark, under *Eucalyptus colophyllo* and *Agonis* sp., 23.vi.2001, N.L. Bougher (PERTH).

Notes: The new name *Inocybe calopedes* is proposed to replace *I. discissa* (Cleland) Grgurinovic, a confusingly similar name to and homonym (Art. 53.3) of *I. discissa* (Fr.) Quél. Grgurinovic (1997) considered *I. discissa* to belong to section *Inocybe* whereas Horak (1979) regarded the species as doubtful, possibly near *I. napipes* Lange, also in section *Inocybe*. However,

the stipe covering is pruinose and a weak marginate bulb is present. Caulocystidia and cauloparacystidia can be found descending to the centre of the stipe and less frequently below. The type clearly features a reddish brown rimose pileus. With these characters taken together, an affinity to the taxonomic section *Marginatae* is likely, though taxa ascribed to this section are not monophyletic (Matheny 2005, Ryberg 2009). The qualifying characters of *I. calopedes* include: a reddish brown, rimose pileus; slender pallid to pale brown tinged, pruinose to glabrescent stipe; stipe base with a weak marginate bulb; short fusiform to utriform, thick-walled pleurocystidia; caulocystidia descending the length of the stipe; and gibbous spores with 9–10 prominent nodules. Recent material of this species observed in Western Australia and Tasmania exhibits pinkish tones on the stipe.

4. *Inocybe dewrangia* Grgurinovic, *Larger Fungi of S. Aust.:* 185 (1997)

Inocybe asterospora sensu Cleland & Cheel, *Trans. Roy. Soc. S. Aust.* 42: 105 (1918).

[Description from AD 12298] *Pileus* up to 3.0 cm diam, convex with a large conical umbo, somewhat golden brown [rimose]. *Lamellae* adnexed, near free, moderately close, cinnamon brown. *Stipe* 3.0 cm long, moderately stout, slightly attenuated upwards, striate, pallid brown tinted, solid, fibrous. Mt. Lofty, South Australia, April.

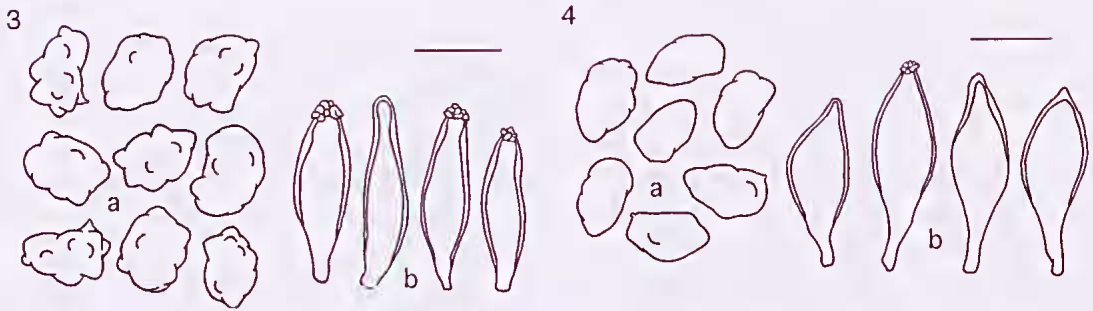


Figure 3: *Inocybe dewrangia* (AD12298, holotype): a. spores; b. pleurocystidia. Scale bar = 10 μm for spores, 25 μm for other cells.

Figure 4: *Inocybe curvipes* (AD12143): a. spores; b. pleurocystidia. Scale bar = 10 μm for spores, 25 μm for other cells.

Basidiospores 9.0–11.5 \times 6.5–8.0 (–8.5) μm (n=20), gibbous, heteromorphic—some spores with 9–12 small nodules with an irregularly angular to subelliptic outline; other spores pentagonal to polyhedral with 7–9 indistinct nodules or merely corners, these common off lamellar mounts; intermediate spores occur on the stipe surface, not reacting in Melzer's, yellowish brown. *Basidia* 26–33 \times 9–11 μm , 4-sterigmate, clavate, hyaline. *Pleurocystidia* 46–60 \times 12–19 μm , utriform to fusiform thick-walled, walls 2.0–3.0 μm thick, hyaline to pale yellowish, mostly with short or no necks, with a basal pedicel; apices obtuse, crystalliferous. *Cheilocystidia* similar to pleurocystidia. *Caulocystidia* similar to pleurocystidia but also fusiform to cylindrical and up to 85 \times 11 μm , restricted to the apex of the stipe, cauloparacystidia not observed, surface of stipe appears infected by an imperfect fungus. *Lamellar trama* not studied. *Pileipellis* a cutis of cylindrical hyphae, light reddish brown pigmented in mass, surmounted by a sparse velipellar layer of narrowly cylindrical hyphae. *Clamps* present. Figs. 3–4.

Specimens examined: SOUTH AUSTRALIA. (= *I. asterospora* sensu Cleland & Cheel), holotype, Mt. Lofty, 7.iv.1917, J.B. Cleland (AD 12298); labeled *I. dewrangia*, Belair NP, 12.iv.1917, J. B. Cleland (AD 12143) (= *I. curvipes*).

Notes: Cleland's original macroscopic notes are reproduced above to emend the concept of this species, the protologue of which is a composite of *I. dewrangia* (AD 12298, originally labeled *I. asterospora*) (Fig. 3) and *I. curvipes* P. Karsten (AD 12143) (Fig. 4). The protologue (Grgurinovic, 1997) describes the pileus as "fibrilloso-squamosus" and the odor as "strong, rather

seminal", two character states not ascribed to the holotype but to AD 12143 also labeled *I. dewrangia*. Unfortunately, AD 12143 is *I. curvipes* P. Karsten, a north temperate species easily identified due to its characteristic broadly ventricose and mucronate pleurocystidia and long, merely angular or indistinctly nodulose spores (Fig. 4). Cleland's collection of this species must have been made under an introduced tree such as *Pinus*, *Quercus*, or *Salix*. In any case, it is not conspecific with the holotype.

Horak studied the collection AD 12298, later designated as the holotype by Grgurinovic, as an undeterminable species of *Astrosporina*. We believe this was the more prudent choice but, unfortunately, must struggle with the limited macroscopic description of the holotype. In sum, *I. dewrangia* appears to be distinctive by the following characters: medium size; golden brown, rimose pileus; finely-fibrillose stipe that is swollen or somewhat enlarged towards the base but not bulbous; caulocystidia restricted to the apex of the stipe; fusiform to utriform, thick-walled pleurocystidia; and the gibbous spores.

5. *Inocybe emergens* (Cleland) Grgurinovic, *Larger Fungi of S. Aust.*: 192 (1997)

Astrosporina emergens Cleland *Trans. Roy. Soc. S. Aust.* 57: 192 (1933).

[Protologue and AD 40426] *Pileus ad 3 cm, ad 1.5 cm procerus, irregulariter lato-conicus, subfibrillosus vel subglaber, pallido-luteus. Lamellae adnatae vel adnexae, confertae, pallido-brunneae. Stipes ad 2.5*

cm, subcrassus, ad basim sub-bulbous, albus, deinde sub-brunneo-albidus. Sporae angulatae, pallido-brunnae, $7.5 \times 4 \mu\text{m}$. Cystidia ampullaformia apicibus asperis, $25\text{--}37 \times 13 \mu\text{m}$. Kinchina, South Australia, June.

Basidiospores $8.5\text{--}10.0$ (~ 10.5) \times $5.0\text{--}6.0 \mu\text{m}$ ($n=20$), gibbous with 7–9 small inconspicuous nodules or corners around an angular outline, of which the ventral side is often concave, apiculus distinct, yellowish brown. Basidia $28\text{--}35 \times 9\text{--}11 \mu\text{m}$, 4-sterigmate, clavate, hyaline. Pleurocystidia $45\text{--}72 \times 14\text{--}22 \mu\text{m}$, utriform to broadly fusiform, without or with very short necks, thick-walled, walls $2.5\text{--}5.0 \mu\text{m}$ thick, hyaline to pale yellowish; apices rounded to obtuse, bearing crystals; with a basal pedicel, not frequent. Cheilocystidia not studied. Caulocystidia similar to pleurocystidia, at times larger and thin-walled, often utriform to broadly cylindrical, in scattered clusters with a few cauloparacystidia—small clavate cells, thin-walled, hyaline—descending to the base of the stipe. Lamellar trama regular, pale yellowish brown or ochraceous in mass, hyphae cylindric. Pileipellis with a suprapellis of irregular to subregular layer of narrowly cylindric velipellar hyphae, these smooth, thin-walled, hyaline; subpellis light ochraceous pigmented in mass, hyphae cylindric to inflated, up to $25 \mu\text{m}$ diam. Clamps present. Fig. 5.

Specimens examined: SOUTH AUSTRALIA. Lectotype here designated, Kinchina, 8.vi.1925, J.B. Cleland (AD 40426).

Notes: The lectotype consists of numerous specimens in satisfactory condition. Cleland's notes that accompany AD 40426 leave no doubt this collection is the source of the information in the protologue. *Inocybe emergens* is distinctive by virtue of its pale yellowish brown, finely-fibrillose pileus; short, stout, pruinose stipe that is pallid and becomes tinged brown; marginately bulbous base; and weakly gibbous spores with an unusual concave depression on the ventral side when viewed in profile. *Inocybe imbricata* (Cleland) Garrido shares the peculiar spore outline, but is readily distinguished by its squamulose pileus and lack of caulocystidia on the stipe.

6. *Inocybe exigua* (Cleland) Grgurinovic, *Larger Fungi of S. Aust:* 184 (1997)

Astrosporina exigua Cleland, *Trans. Roy. Soc. S. Aust.* 57: 192 (1933).

[Protologue] Pileus ad 1.2 cm, convexus vel campanulatus, subfibrillosus, cinnamoneo-brunneus. Lamellae adnatae, subconfertae, subcinnamoneae. Stipes 1.2 cm, subfibrillosus, albidus. Sporae nodosae, $8.0\text{--}8.5 \mu\text{m}$. Cystidia pauca ampullaformia apicibus glabris. Hope Valley, South Australia, April.

Basidiospores $8.0\text{--}10.5 \times 6.0\text{--}7.0$ (~ 7.5) μm ($n=20$), gibbous with 9–13 conspicuous or moderate to prominent-sized nodules around a subelliptic to angular outline, similar in shape to *Inocybe lanuginosa* and *I. stellatospora*, with a small apiculus, yellowish brown, not reacting in Melzer's. Basidia $26\text{--}38 \times 8\text{--}10 \mu\text{m}$, 4-sterigmate, clavate, hyaline. Pleurocystidia $32\text{--}65 \times 15\text{--}27 \mu\text{m}$, saccate, pyriform, to utriform with well-rounded apices, typically thin-walled but at times with thickened apically and up to $1.5 \mu\text{m}$ thick, hyaline, apices occasionally crystalliferous, with a short pedicel, infrequent. Cheilocystidia not studied. Caulocystidia descending the entire length of the stipe but less frequent on the lower half, similar to pleurocystidia, thin-walled, paracystidia not observed. Lamellar trama regular, pale yellowish brown in mass, hyphae cylindric. Pileipellis a cutis of cylindric to inflated hyphae, up to $20 \mu\text{m}$ diam, incrustated, "Tawny" to "Ochraceous-Tawny" in mass. Clamps present. Fig. 6.

Specimens examined: SOUTH AUSTRALIA. Holotype, near Adelaide, Hope Valley, on sandy soil, 29.iv.1923, J.B. Cleland (AD 12226).

Notes: *Inocybe exigua* is a small species with a cinnamon brown, finely-fibrillose pileus, a pallid stipe that is likely pruinose, prominently gibbous spores, and generally thin-walled or only slightly thick-walled, saccate, short pleurocystidia. Cleland did not mention the presence of a bulb at the stipe base, as was done for *I. emergens* and *I. calopedes*.

7. *Inocybe fibrillosibrunnea* Miller & Hilton, *Sydowia* 39: 132 (1987)

[Protologue] Pileus 14–21 mm broad, convex, convex-umbonate, brown to dark brown, "Verona Brown" to "Snuff Brown", dry, matted fibrillose tufts of light tipped fibrils over the disc somewhat recurved, irregularly raised over the margin, odor not distinctive. Lamellae subdistant to distant, adnate, alternate with long lamellulae, minutely fimbriate, white margins, light brown, "Sayal Brown". Stipe 10–37 mm long, (1–) 2.5–

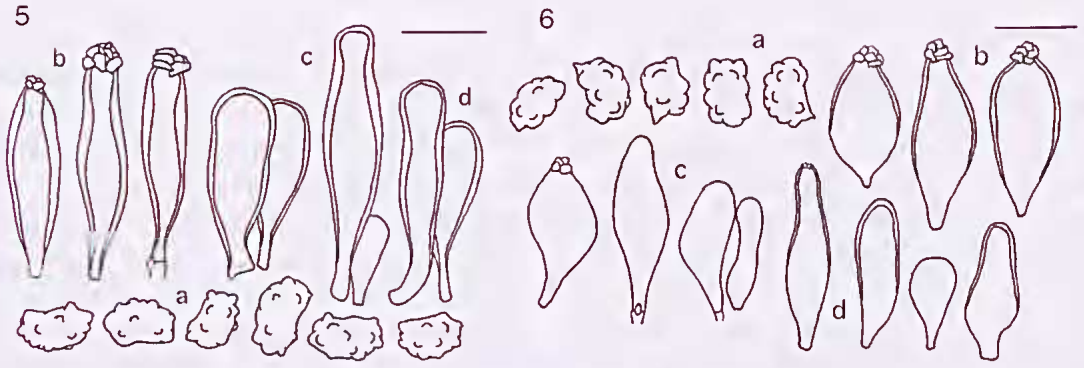


Figure 5: *Inocybe emergens* (AD40426, lectotype of *Astrosporina emergens*): a. spores; b. pleurocystidia. c. caulocystidia from stipe apex; d. caulocystidia above stipe base. Scale bar = 10 μm for spores, 25 μm for other cells.
Figure 6: *Inocybe exigua* (AD12226, holotype of *Astrosporina exigua*): a. spores; b. pleurocystidia; c. caulocystidia from stipe apex; d. caulocystidia above stipe base. Scale bar = 10 μm for spores, 25 μm for other cells.

3.5 mm broad usually enlarging somewhat at the apex and base, dry, coarsely pubescent with tufts of minute fibrils over the base in age, concolorous with the *pileus* or somewhat lighter, "Sayal Brown" to "Snuff Brown", veil cortinate, scanty, light brown, soon disappears with no annular zone.

Basidiospores (8.0–) 8.5–10.5 (–12.0) × (4.5–) 5.0–6.0 (–6.5) μm (n=27), spores from lamellar mounts reach up to 12.0 μm in length, smooth, amygdaliform with bluntly pointed apices, not reniform but at times with a suprahilar depression, with a distinct apiculus and slightly thickened wall, yellowish brown. *Basidia* 26–30 × 8–10 μm, 4-sterigmate, clavate, hyaline. *Pleurocystidia* 70–112 × 11–20 μm, lageniform with long cylindrical to tapered necks, thick-walled, walls 2.5–4.0 μm thick, (pale) yellow in KOH, with a short basal pedicel; apices obtuse, sparsely crystalliferous; abundant. *Cheilocystidia* similar to pleurocystidia but shorter, frequent, paracystidia clavate, thin-walled, hyaline. *Stipitipellis* with dense clusters of caulocystidia similar to pleurocystidia at apex of stipe, at times with lanceolate necks, mixed with smaller cells of intermediate size and shape—mostly cylindrical, occasionally fusiform or clavate, thin- or thick-walled, hyaline, intergrading with caulocystidioid hairs stemming from vestiture hyphae just below the apex; caulocystidioid hairs usually filiform, thick-walled, continuing down to base of stipe. *Pileipellis* a cutis of regular hyphae giving rise to ascending broad fascicles of hyphae, these cylindrical to

inflated, 5–28 μm diam, thin- or with slightly thickened walls, brown pigmented in mass, incrusting pigments very faint; terminal cells filiform to cylindrical, thin- to thick-walled, often flexuous and tapered distally. *Clamps* present. Fig. 7.

Specimens examined: WESTERN AUSTRALIA. Holotype, 31.vii.1977, Dell, on ground under *Eucalyptus marginata* and *E. calophylla* (Myrtaceae), NW swamp, 10 km E of Kalamunda, Western Australia (PERTH 00777234 (UWA 2204)).

Notes: The gross morphological description is taken from Miller and Hilton (1987), while microscopic observations are our own. *Inocybe fibrillosibrunnea* is characterised microscopically by the very long, lageniform, yellow pleurocystidia; apex of stipe with caulocystidia soon integrating with caulocystidioid hairs, the latter descending to the base of the stipe; and amygdaliform spores mostly 8.5–10.5 × 5.0–6.0 μm. The spores may have a suprahilar depression, which probably led to Miller and Hilton to describe the spores as reniform. Macroscopically, this is a species with a brown or umbrinous pileus that is matted fibrillose-squamulose with tips slightly recurved on the disc. The stipe appears coarsely-fibrillose with scattered tufts of fibrils.

8. *Inocybe fulvo-olivacea* Cleland, *Trans. Roy. Soc. S. Aust.*: 57: 192 (1933)

[Protologue and AD 40427] *Pileus* 1.2 cm, *perconvexus* (*magis minusve*), *subfibrillosus*, *fulvo-olivaceus*. *Lamellae*

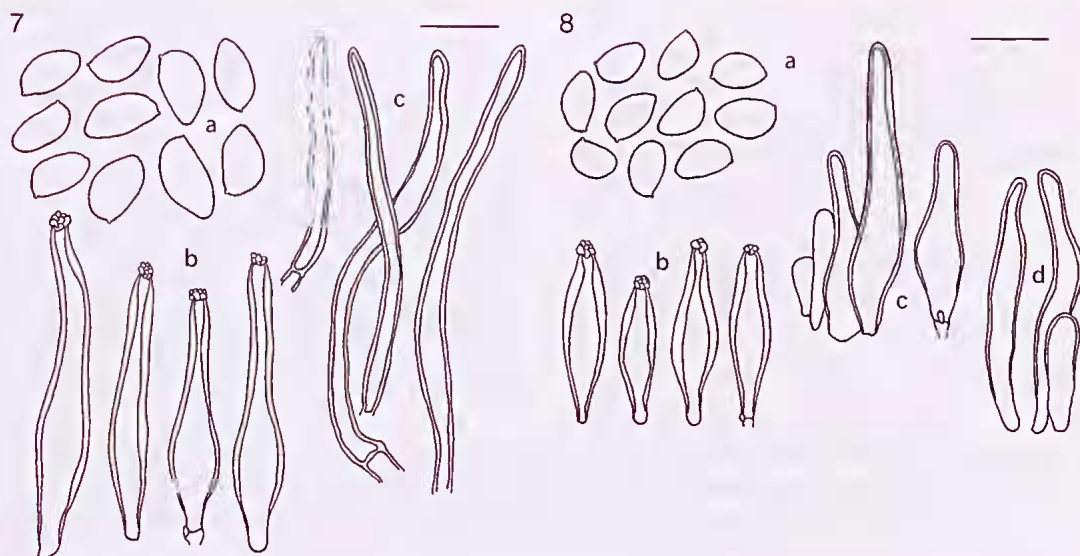


Figure 7: *Inocybe fibrillosibrunnea* (PERTH00777234, holotype): a. spores; b. pleurocystidia; c. caulocystidioid hairs from throughout the stipe. Scale bar = 10 μ m for spores, 25 μ m for other cells.

Figure 8: *Inocybe fulvo-olivacea* (AD40427, lectotype): a. spores; b. pleurocystidia; c. caulocystidia from stipe apex; d. caulocystidioid hairs from stipe centre. Scale bar = 10 μ m for spores, 25 μ m for other cells.

adnatae, ascendentes, subconfertae, pallidiores quam "Saccardo's UMBER". Stipes 2.5 cm, tenuis, granulosis, subcavus, pallido-brunneus, saepe supra subroseus. Sporae subtriangulares, perobliquae, 6.5–7 \times 4 μ m. Cystidia subventricosa, 45–65 \times 15–17 μ m. Belair, South Australia, August.

Basidiospores 6.5–7.5 (–8.0) \times 4.5–5.5 μ m (n=20), smooth, broadly amygdaliform to elliptic, mostly with (sub)conical apices, thick-walled, with a distinct apiculus, yellowish brown. *Basidia* 23–27 \times 7–9 μ m, 4-sterigmate, clavate, hyaline to pale yellowish, often collapsed. *Pleurocystidia* 48–70 \times 10–15 μ m, fusiform to slenderly fusiform, thick-walled, walls 2.5–4.0 μ m thick, hyaline or pale yellowish, with no necks or short ones, at times merely tapered upwards, with a basal pedicel; apices obtuse, crystalliferous. *Cheilocystidia* similar to pleurocystidia, paracystidia not studied. *Lamellar trama* regular, pale yellowish in mass, hyphae cylindrical to inflated, up to 18 μ m diam. *Caulocystidia* metuloid, fusiform to cylindrical or irregularly cylindrical, also lageniform, somewhat longer, 60–90 \times 12–17 μ m, at times with distinct necks, descending at least to the centre of the stipe, mixed with few cylindrico-clavate to clavate, thin-walled cells; base of stipe with vestiture of

interwoven cylindrical hyphae. *Pileipellis* a cutis, poorly reviving. *Clamps* present. Fig. 8.

Specimens examined: SOUTH AUSTRALIA. Lectotype here designated, Belair, on ground, 4.viii.1928, J.B. Cleland (AD 40427 (=ADW 12681)).

Notes: AD 40427 contains several specimens in satisfactory condition and notes that are without doubt the source for the protologue of *I. fulvo-olivacea*. The corresponding material does not deviate from the protologue, thus, we designate AD 40427 as the lectotype. Horak (1980) was unable to locate this material. Grgurinovic (1997), however, supplied Cleland's handwritten notes but did not study the collection. *Inocybe fulvo-olivacea* is characterised by its "Tawny-Olive" [per Cleland] finely-fibrillose pileus; small size; slender, pallid brownish stipe flushed with pink above that is at least pruinose on the upper half; small broadly amygdaliform to elliptic spores; and medium-sized thick-walled fusiform pleurocystidia. The collection appears similar to AD 5436 and AD 5437 determined by Cleland as *I. serrata* differing by a pale grayish brown or a pale yellowish brown pileus and without mention of rose tints on the stipe.

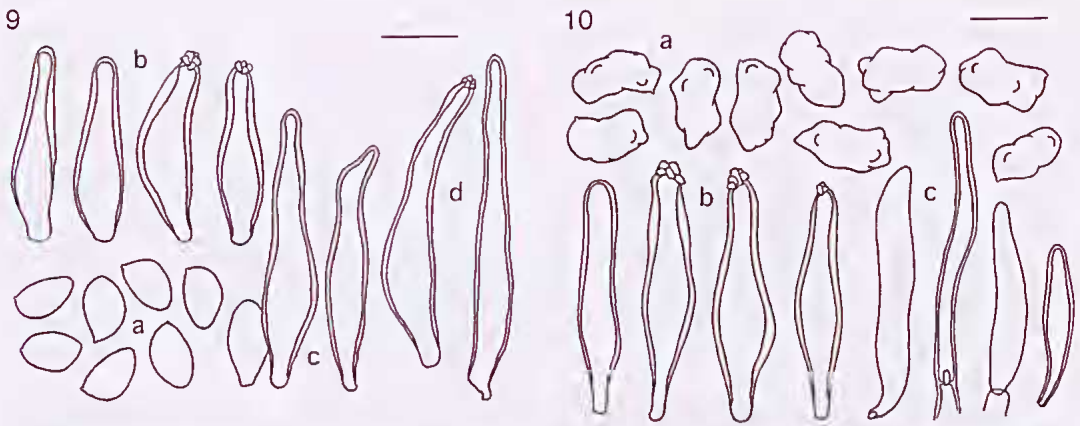


Figure 9: *Inocybe granulospes* (AD5450, lectotype): a. spores; b. pleurocystidia; c. caulocystidia from stipe apex; d. caulocystidioid hairs from stipe centre. Scale bar = 10 µm for spores, 25 µm for other cells.

Figure 10: *Inocybe imbricata* (AD12227, holotype): a. spores; b. pleurocystidia; c. caulocystidioid hairs from stipe apex. Scale bar = 10 µm for spores, 25 µm for other cells.

9. *Inocybe granulospes* Cleland, *Trans. Roy. Soc. S. Aust.* 57: 192 (1933)

[Protologue and AD 5450] *Pileus* 1.2–1.8 cm, *convexus*, *umbonatus*, *fibrillosus*, *tabacino-brunneus* ad "*Bister*". *Lamellae* *adnatae*, *subconfertae*, *subventricosae*, *tabacino-brunneae*. *Stipes* 1.8–2.5 cm, *subtenuis*, *e farcto subcavus*, *aequalis*, *sub-bulbosus*, "*Bister*" *granulis albidis farinaceis vel fibrillosis*. *Caro* *pertenuis*. *Sporae* *obliquae*, $8.5 \times 5 \mu\text{m}$. *Cystidia inflata ad angustio-fusiformia*, $45 \times 19 \mu\text{m}$, $50 \times 9 \mu\text{m}$. *Plantae gregariosae*. *Stirling West*, *Mount Lofty*, *South Australia*, *July*.

Basidiospores (7.0–) 7.5–8.5 × (4.5–) 5.0–5.5 µm (n=20), smooth, subamygdaliform or broadly so to elliptic with pointed or rounded apices, with slightly thickened wall and small but distinct apiculus, yellowish brown. *Basidia* 26–33 × 7–8 µm, 4-sterigmate, clavate, hyaline. *Pleurocystidia* 55–75 × 10–15 µm, slenderly fusiform, less often or rarely lageniform, thick-walled, walls 2.5–4.0 µm thick, pale yellow or hyaline, with distinct necks and basal pedicel; apices obtuse, crystalliferous. *Cheilocystidia* not studied. *Stipitipellis* with dense clusters of caulocystidioid cells at apex of stipe, these 83–125 × 9–13 µm, and cells of intermediate shape and size—mostly fusiform to subcylindric or irregularly cylindric but thick-walled—descending to the centre of the stipe, flexuous; vestiture hyphae interwoven and more conspicuous at the base of the stipe with

infrequent caulocystidioid terminal cells. *Lamellar trama* regular, subhyaline to pale yellowish brown, hyphae cylindric, up to 13 µm diam. *Pileipellis* a cutis of repent hyphae, these cylindric to inflated, up to 23 µm diam, faintly incrustated and with thin to slightly thickened walls; surmounted by broad, smooth, thin-walled hyphae 4–16 µm diam. *Clamps* present. Fig. 9.

Specimens examined: **SOUTH AUSTRALIA.** Lectotype here designated, *Stirling West*, gregarious, 23.vi.1927, *J.B. Cleland* (AD 5450); *Mt. Lofty*, on ground, 7.iv.1917, *J.B. Cleland* (AD 5451) (not *I. granulospes*).

Notes: The collection AD 5450 is designated here as the lectotype of *I. granulospes* since it is the collection from which the protologue is clearly drawn. It consists of numerous specimens in satisfactory condition. Contrary to Horak (1980) *I. granulospes* is not the same species as *I. australiensis*. Horak did study AD 5450 (as ADW 12719) and obviously drew his conclusions based on a number of microscopic similarities, namely spore and cystidial characters. However, side-by-side comparison of the types indicates dissimilarities in the surface of the pileus. *Inocybe australiensis* possesses a very dark brown, squarrose to squamulose or scaly pileus; *I. granulospes* has a merely fibrillose dark brown to brown or umbrinous pileus. As pointed out by Grgurinovic (1997), AD 5451 collected at *Mt. Lofty* in 1917, although determined by Cleland as *I. granulospes*, is not conspecific with the lectotype.

**10. *Inocybe imbricata* (Cleland) Garrido,
Biblioth. Mycol. 120: 176 (1988)**

Astrosporina imbricata Cleland, *Trans. Roy. Soc. S. Aust.*: 57: 192 (1933).

[Protologue] *Pileus ad 16 mm, convexus vel subconico-campanulatus, fibrillis adpressis umbricatis [sic], fusco-brunneus. Lamellae adnatae, deinde secedentes, subconfertae, subventricosae, fusco-brunneae. Stipes 16 mm, subtenuis, aequalis, infarctus, fibrillosus, pallido-brunneus. Caro pilei pallida, stipis sub-brunnea. Sporae angulatae, 9–11 × 5.5 µm. Kinchina, South Australia, June.*

Basidiospores (9.0–) 9.5–11.0 (–11.5) × 5.5–6.5 µm (n=20), oblong-angular with 5–8 inconspicuous nodules, at times these merely corners, around a rectangular to trapeziform outline, usually with a conical apical nodule, at times one side with a concave depression, yellowish brown, not reacting with Melzer's. *Basidia* 30–42 × 7–10 µm, 4-sterigmate, clavate, hyaline to pale ochraceous. *Pleurocystidia* 58–76 × 11–17 µm, fusiform or slenderly so to subcylindric, thick-walled, walls 2.0–3.0 µm thick, hyaline, usually with a distinct neck and slender basal pedicel; apices obtuse and lacking crystals. *Cheilocystidia* similar to pleurocystidia, often shorter, at times ochraceous. *Stipitipellis* with scattered cystidioid end cells at the apex, these generally cylindric or fusiform and thin-walled, cauloparacystidia not observed; centre of stipe with interwoven vestiture hyphae terminating in caulocystidioid hairs, vestiture hyphae descending to base of stipe. *Lamellar trama* regular, light yellowish brown in mass, hyphae cylindric to inflated, up to 15 µm diam. *Pileipellis* a cutis giving rise to broad fascicles of somewhat ascending hyphae, these often inflated, up to 25 µm diam, end cells not differentiated, light reddish brown or "Tawny" pigmented in mass, walls thin or slightly thickened, incrustations not evident. *Clamps* present. Fig. 10.

Specimens examined: SOUTH AUSTRALIA. Holotype, Kinchina, 8.vi.1925, leg. J.B. Cleland (AD 12227); AD 5439 (=AD 12673B, originally mixed with *I. murrayana* AD 5440, on ground, Kinchina, 8.vi.1925, leg. J.B. Cleland).

Notes: *Inocybe imbricata* is distinct by virtue of its small size; dark brown, shaggy-squamulose pileus; fibrillose, pale brownish even stipe; thick-walled,

fusiform to cylindric pleurocystidia; and obong-angular spores with few indistinct nodules and corners. The spores are unusual in that they possess a concave depression on one side. We agree with Grgurinovic (1997) that the lectotype of *I. murrayana* Cleland is not a synonym of *I. imbricata*.

11. *Inocybe murrayana* Cleland, *Trans. Roy. Soc. S. Aust.* 57: 192 (1933)

[Protologue] *Pileus ad 1.6 cm, conicus, deinde expansus, umbonatus magis minusve, subtili-fibrillosus vel fibrilloso-squamosus, sericeo-nitidus, cinnamoneo-brunneus vel "Buckthorn Brown" vel "Dresden Brown" vel russus. Lamellae adnatae vel adnexae, subconfertae, marginibus subserratis, tabacino-brunneus vel avellaneus. Stipes 2.5 cm, aequalis, subtili-striatus vel fibrillosus vel farinaceus, solidus, tabacino-brunneus vel brunneo-pallidus. Sporae obliquae, pallido-brunneae, 9–11–13 × 5.2–5.5 µm. Cystidia acuminata basi inflata vel ventricosa, 85 × 11 µm. South Australia, Kinchina, August.*

Basidiospores (9.0–) 9.5–11.5 (–12.0) × (4.5–) 5.0–6.0 µm (n=20), mostly 10.0–11.0 × 5.0–5.5 µm, smooth, amygdaliform, at times oblong-amygdaliform, with conical apices, slightly thick-walled, with a small but distinct apiculus, yellowish brown, unreactive in Melzer's. *Basidia* about 28 × 9 µm, 4-sterigmate. *Pleurocystidia* 65–77 × 11–18 µm, slenderly fusiform, fusiform, or lageniform, thick-walled, walls 2.0–3.0 µm thick, hyaline; with elongated necks and short tapered pedicel; apices obtuse, often crystalliferous; frequent. *Cheilocystidia* similar to pleurocystidia, at times yellowish, scattered among hyaline, thin-walled, clavate paracystidia; abundant. *Caulocystidia* similar to pleurocystidia but often lageniform with lanceolate necks and subacute apices, mixed with cauloparacystidia, together forming scattered clusters at the apex and below the centre of the stipe; base with metuloid cystidia but cauloparacystidia not observed. *Lamellar trama* regular, pale ochraceous in mass, hyphae cylindric, up to 15 µm diam. *Pileipellis* a cutis of russet brown to reddish brown hyphae in mass, these cylindric, 6–15 µm diam, thin-walled or slightly thickened, incrustated. *Clamps* present. Fig. 11.

Specimens examined: SOUTH AUSTRALIA. Lectotype, Kinchina, 1 August 1925, J.B. Cleland (AD 5441); Kinchina,

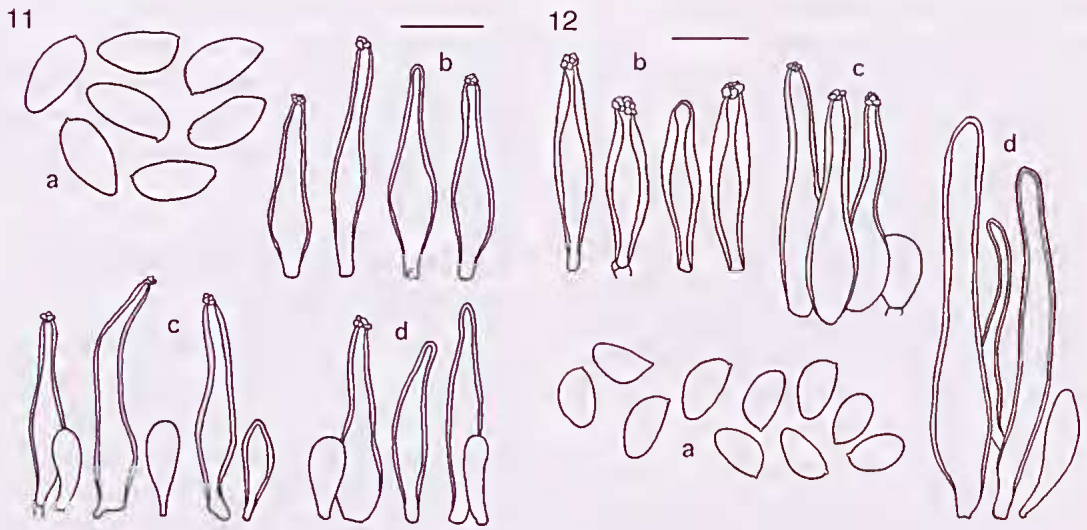


Figure 11: *Inocybe murrayana* (AD5441, lectotype): a. spores; b. pleurocystidia; c. caulocystidia from stipe apex; d. caulocystidia above stipe base. Scale bar = 10 μ m for spores, 25 μ m for other cells.

Figure 12: *Inocybe serrata* (AD5438, lectotype): a. spores; b. pleurocystidia; c. caulocystidia from stipe apex; d. caulocystidioid hairs from stipe centre. Scale bar = 10 μ m for spores, 25 μ m for other cells.

8.vi.1925, J.B. Cleland; AD 5442, Monarto South, Kinchlna, 9.vii.1922, J.B. Cleland (AD 5440 p. p.) (doubtfully *murrayana*).

Notes: *Inocybe murrayana* has a somewhat confusing taxonomic history. Horak (1979) considered AD 5440 (=ADW 12673) as the holotype and found the material conspecific with *I. imbricata* (as *Astrosporina imbricata*). Evidently, only a portion of the type was studied because Grgurinovic (1977) found AD 5440 to be heterogeneous with another portion representative of *I. murrayana*, and consequently selected AD 5441 as the lectotype. The lectotype contains several specimens in adequate condition, and we concur that a portion of AD 5440 is indeed similar to *I. murrayana* and consistent with the protologue, including Cleland's handwritten notes describing the collection and its occurrence.

Inocybe murrayana is a small species with a cinnamon brown or umbrinous ("Snuff Brown") pileus and similarly coloured stipe. The pileus at most reaches 2 cm in diameter and often is fibrillose or with a matted fibrillose-squamulose disc (AD 5442). The stipe is generally up to 2.5 cm long, slender, without a bulb, brown to pale brown, and is pruinose at least down to the centre of the stipe. Microscopically, *I. murrayana* is distinctive due to the long amygdaliform or oblong-

amygdaliform shaped spores that are mostly 10.0–11.0 \times 5.0–5.5 μ m; and caulocystidia or caulocystidioid cells with lanceolate necks mixed with other caulocystidioid elements of intermediate shape and size descending to at least the centre of the stipe.

AD 5442 is unusual due to the matted fibrillose-squamulose centre of the pileus and pleurocystidia with yellow walls. This collection would suggest a close relationship with *I. fibrillosibrunnea* Miller & Hilton, which differs by the longer pleurocystidia.

12. *Inocybe serrata* Cleland, *Trans. Roy. Soc. S. Aust.* 57: 192 (1933)

[Protologue] *Pileus* 1.2 cm, *convexus, fibrillosus, Verona-brunneus vel pallido-brunneus. Lamellae adnatae, marginibus serratis et interdum pallidioribus, tabacino-brunneae vel ligno-brunneae. Stipes* 1.8–3.0 cm, *tenuis, attenuatus, fibrillosus, approxime "Warm Buff", basibus villosis. Caro firma, in medio 1 cm lata, farinaceus, pallido-brunneus. Sporae glabrae, obliquae, pallido-flavo-brunneae, 7.5–9 \times 4.5–5 μ m. Cystidia fusiformes vel ampulliformes, 27–56 \times 11–13 μ m. Plantae gregariosae vel subcaespitosae. Mount Lofty, Upper Tunkalilla Creek, South Australia, April–June.*

Basidiospores (6.0–) 6.5–9.0 (–9.5) × 4.5–5.5 µm (n=50/4), smooth, variable in shape—amygdaliform, broadly amygdaliform, to subtriangular in profile, or elliptic, without a suprahilar depression; apices bluntly pointed to rounded; with a small but distinct apiculus, thick-walled, yellowish brown. *Basidia* 23–30 × 7–8 µm, 4-sterigmate, clavate, hyaline. *Pleurocystidio* 53–75 × 11–15 µm, fusiform, thick-walled, walls up to 4.0 µm thick, hyaline or pale yellowish, with necks or merely tapered above to obtuse, crystalliferous apices, with a basal pedicel, frequent. *Cheilocystidia* not studied. *Coulocystidio* often lageniform, also fusiform, thick-walled and with crystalliferous apices, 83–110 × 14–18 µm, descending to at least the centre of the stipe mixed with cauloparacystidia and intermediate cells of varying shape and size, intergrading with caulocystidioid hairs at least by the centre of the stipe; lower part of stipe composed of interwoven vestiture hyphae with few cystidioid end cells. *Lomellor tromo* not studied. *Pileipellis* a cutis of lightly incrustated hyphae, up to 20 µm diam, "Ochraceous-Tawny" in mass, thin- to slightly thick-walled, surmounted by an interwoven layer of smooth, thin-walled, hyaline superficial hyphae, up to 15 µm diam. *Clomps* present. Fig. 12.

Specimens examined: SOUTH AUSTRALIA. Mt. Lofty, 21.vi.1924, J.B. Cleland (AD 5438 (=ADW 12672)); Mt. Lofty, 7.iv.1917, on ground under log, J.B. Cleland (AD 5436 (=ADW 12670)); Mt. Lofty, 7.iv.1917, J.B. Cleland (AD 5437 (=ADW 12668)); lectotype here designated, Mt. Lofty, 2.vi.1928, J.B. Cleland (AD 5444 (=ADW 12669)). Upper Tunkalilla Creek, subcaespitose on ground, 4.vi.1930, J.B. Cleland (AD 5446 (=ADW 12667)), determination questionable.

Notes: Horak (1980) cited ADW 12668 (=AD 5437) as the holotype, however, this cannot be the case given that Cleland's protologue was clearly derived from notes of ADW 12672 (=AD 5438). Hence, AD 5438 would be the proper collection to designate as the lectotype if not for its heterogeneous state, which contains both *Inocybe* and *Cortinarius* species. Even with the numerous *Cortinarius* basidiomes aside, it is not clear from the protologue that Cleland derived the macroscopic description from the *Inocybe* portion of the collection. Furthermore, the shape of the spores, a critical character in *Inocybe* taxonomy, varies among the remaining specimens. Some collections collected many years apart and determined by Cleland as *I. serroto* are inconsistent with each other, viz. AD 5446

(spores mostly 9.0–11.0 × 4.5–5.5 µm that possibly represents *I. murrayana* or *I. fibrillosibrunneo*). Here we designate AD 5444 as lectotype of *I. serroto*, the macroscopic notes of which include the following: pileus up to 1.3 cm diam, convex, fibrillose, pallid brown, colour of dead grass; lamellae adnate, "Wood Brown", edges finely serrate and white; stipe up to 3.0 cm long, slender, mealy fibrillose. Mt. Lofty, South Australia, 23 June 1928. Grgurinovic (1997) applied the name *I. australiensis* to *I. serroto*, but the former species differs by its dark brown and distinctly scaly pileus.

Excluded Taxa

Inocybe austrobrillosa Grgurinovic, *Austral. Mycol.* 21: 35 (2002)

Cortinarius fibrillosus Cleland, *Trans. Roy. Soc. S. Aust.* 52: 222 (1928); *Inocybe fibrillosa* (Cleland) Grgurinovic, *Larger Fungi of S. Aust.*: 190 (1997), non *Inocybe fibrillosa* Peck, *Ann. Rep. N.Y. St. Mus.* 41: 65 (1888).

Inocybe cystidiocotenoto Grgurinovic, *Larger Fungi of S. Aust.*: 188 (1997); *Cortinarius cystidiocotenotus* (Grgurinovic) Gasparini, *Austral. Mycol.* 25: 25 (2006).

[Protologue] *Pileus* 1 to 1 1/2 inches, deeply convex, then convex and gibbous, hoary from whitish mealy fibrils sometimes forming a white edge to the *pileus*, when moist reddish brown [near Russet (xv.) or darker], when dry between Cinnamon and Cinnamon Buff (xxix). *Gills* adnexed, moderately close, yellower than Ochraceous Tawny (xv.). *Stem* up to 1 3/4 inches (4.3 cm) high, slender, fibrillose, pallid whitish, hollow. *Flesh* reddish, thin. *Spores* pale brown, oblique 9 × 4.5 µm. *Caespitose* on the ground near stumps. Mt. Lofty, South Australia, June.

Basidiospores (7.5–) 8.0–9.0 × 4.5–5.0 (–5.0) µm (n=20), smooth in appearance even in Melzer's reagent, elliptic to subamygdaliform with obtuse apices, noticeably pale—"Warm Buff" or yellowish (2.5Y 7/6) in KOH; reddish brown or "Tawny" viz., dextrinoid (near 2.5Y 4/6) in Melzer's; thick-walled, germ pore and plage absent, with a small but distinct apiculus. *Basidio* 22–28 × 6–8 µm, 4-sterigmate, clavate, mostly hyaline but at times ochraceous. *Pleurocystidio* absent. *Cheilocystidio* 17–21 × 14–15 µm, saccate to pyriform or broadly clavate, thin-walled, hyaline, difficult to revive but edges of lamellae are sterile under the stereomicroscope. *Caulocystidia* absent; vestiture

hyphae interwoven, often thick-walled at least from the lower part of the stipe, hyaline, cylindrical, 4–12 µm diam. *Lamellar troma* regular, light “Tawny” or reddish brown pigmented in mass, hyphae cylindrical to inflated, up to 25 µm diam. *Pileipellis* composed of an interwoven suprapellis or ascending layer of cylindrical to inflated hyphae, these hyaline, thin- to thick-walled, walls up to 1.5(–2.0) µm thick; subpellis ochraceous pigmented in mass, hyphae primarily inflated, up to 20 µm diam, lightly incrustated. *Clomps* present.

Specimens examined: SOUTH AUSTRALIA. Lectotype, Mt. Lofty, 23.vi.1928, J.B. Cleland (AD 4169); Morialta Falls, caespitose on burnt soil under *Eucalyptus* sp., 28.vi.1984, C.A. Grgurinovic (35684) & R.E. Halling (AD 12264), holotype of *Inocybe cystidiocatenata*.

Notes: Given the presence of cheilocystidia and smooth pale brownish spores, Grgurinovic (1997) transferred this species to *Inocybe*. Later, realising *Inocybe fibrillosa* (Cleland) Grgurinovic was a homonym of *I. fibrilloso* Peck, a new name, *I. austrofibrillosa* Grgurinovic, was proposed (Grgurinovic 2002). Several lines of evidence, however, demonstrate that *I. austrofibrillosa* is not an *Inocybe*: the *Telamonia*-like habit, the absence of pleurocystidia but presence of a distinct apiculus on the spores, and the reddish brown colour or dextrinoid reaction of the spores in Melzer’s. We consider Cleland’s original generic disposition, *Cortinarius*, as the best placement of this unusual species despite the appearance of smooth spore walls, pale coloured spore deposit and spore wall reaction in Melzer’s. The presence of cheilocystidia does not in itself exclude *Cortinarius* from consideration as a small number of species exhibit their presence; furthermore, pale pigmented spores that appear smooth under light microscopy, although highly unusual, can exceptionally be found in *Cortinarius*, e.g., *C. oureifolius* Peck.

Fresh material of this species, identified as *I. cystidiocatenata* Grgurinovic, is not uncommon in Western Australia where a number of collections have been routinely documented. One of these (E6584 PERTH) was sequenced (AY333317 *rpb2*, AY380361 nLSU-rRNA, AY333306 *rpb1*: accessions at GenBank) and confirmed as closely related to other species of *Cortinarius* (Matheny & Ammirati 2003). There is little doubt that *I. cystidiocatenata* is conspecific with *Cortinarius fibrillosus* after examination of both

types, and that *C. fibrillosus*, the older name, has nomenclatural priority. Grgurinovic maintained their separation chiefly on cystidial characters, which we were unable to verify. Both types also share the thick-walled hyphae of the pileipellis and vestiture hyphae of the stipe. The spores of the type of *I. cystidiocatenata*, although largely unreactive in Melzer’s, feature occasional spores that are dextrinoid. The following features stand out for this species: the bright brown gills and flesh (near 6C8), pale spores, and cheilocystidia of inflated elements in chains in a broad layer on the gill edge. Recently, *Inocybe cystidiocatenata* was recombined into *Cortinarius* by Gasparini (2006), but comparison to *C. fibrillosus* was not made, unfortunately. The species was included in a ribosomal RNA phylogeny of *Cortinarius* and placed in the *Obtusi* clade by Garnica et al. (2005). A macroscopic description and illustrations (Pl. 8a and Pl. 29c) can be found in Grgurinovic (1997) and Gasparini (2006). For completeness our microscopic observations of the type of *I. cystidiocatenata* are as follows:

Basidiospores 8.0–9.0 (–10.5) × 5.0–5.5 µm (n=20), elliptic to subamygdaliform with mostly obtuse apices, smooth in KOH and Melzer’s, noticeably quite pale in KOH—very pale brown or “Warm Buff”, mostly not changing colour in Melzer’s but occasional spores dextrinoid, with thick wall and a small but distinct apiculus, germ pore and plage absent. *Bosidia* 25–31 × 6–8 µm, 4-sterigmate, clavate, hyaline or occasionally ochraceous, not necropigmented. *Pleurocystidia* absent. *Cheilocystidia* elliptic or saccate, quite small but as depicted by the type line drawings (Grgurinovic 1997) in relation to the size of the basidia. *Coulocystidia* absent; stipe sheathed by vestiture hyphae, these interwoven, filiform, smooth, usually thick-walled, similar to those of the suprapellis on the pileus; terminal cells undifferentiated; stipe hyphae pale ochraceous in mass. *Lomellar troma* regular, bright cinnamon pigmented in mass, hyphae cylindrical to inflated, up to 25 µm diam, incrustated. *Clomps* present.

***Inocybe gigaspora* (Cooke & Masee)
McAlpine, Syst. Arr. Austral. Fungi: 22 (1895)**

Agoricus gigasporus Cooke & Masee in Cooke, *Grevilleo* 18: 3 (1889); *Hebeloma gigasporum* (Cooke & Masee) Sacc., *Syll. Fung.* 9: 102 (1891); *Phoeomorosmius*

gigasporus (Cooke & Masee) Pegler, *Austral. J. Bot.* 13: 333 (1965)

Pegler (1965) examined the type held at Kew and recorded 2-sterigmate basidia, absence of pleurocystidia, and large, smooth, deep ferruginous spores ($16\text{--}19 \times 9\text{--}11 \mu\text{m}$). A combination in *Phaeomarasmius* was proposed. What Pegler neglected to add was that the spores contain a broad conspicuous germ pore, which is noticeable in his fig. 5/13a. Because of the pronounced germ pore recorded by Pegler, the disposition of *Agaricus gigasporus* resides outside the Inocybeaceae. No new information was added by Horak (1980).

***Inocybe gomphodes* (Kalchbr.) Sacc., Syll.**

Fung. 5: 786 (1887)

Agaricus gomphodes Kalchbr., *Grevillea* 8: 152 (1880)

Pegler (1965) and Horak (1980) examined the type at Kew, and both concurred with the exclusion of this species from *Inocybe* given the dextrinoid spores with a germ pore and the poor fragmentary condition of the type. We have no new information to add.

***Inocybe marangania* Grgurinovic, Larger**

Fungi of S. Austral.: 179 (1997) Fig. 13

For the macroscopic description, see Grgurinovic (1997).

Basidiospores $7.0\text{--}8.0 \times 4.0\text{--}5.0 \mu\text{m}$ ($n=15$), smooth, (sub)amygdaliform, not phaseoliform, with conical apices in profile; apices with an indistinct germ pore; "Tawny" or "Hazel" in KOH, thick-walled, walls up to $0.4 \mu\text{m}$ thick, with an indistinct apiculus, not reacting in Melzer's. *Basidia* $20\text{--}27 \times 6\text{--}7 \mu\text{m}$, 4-sterigmate, cylindrico-clavate to cylindric, hyaline or ochraceous. *Pleurocystidia* $43\text{--}80 \times 10\text{--}14 \mu\text{m}$, mostly lageniform with elongated cylindric necks, apices obtuse or at times swollen or subacute, not capitate; intermediate shapes also observed that are tapered distally, thin-walled, apices not crystalliferous but necks may be granular incrustated, hyaline or ochraceous or with vacuolated portions with yellow contents. *Cheilocystidia* $28\text{--}55 \times 10\text{--}14 \mu\text{m}$, a few similar to pleurocystidia, but mostly fusiform or broadly so that are merely tapered distally to an obtuse apex, thin-walled, hyaline or ochraceous, paracystidia not observed. Extreme apex of stipe with clusters of caulocystidia, usually cylindric and

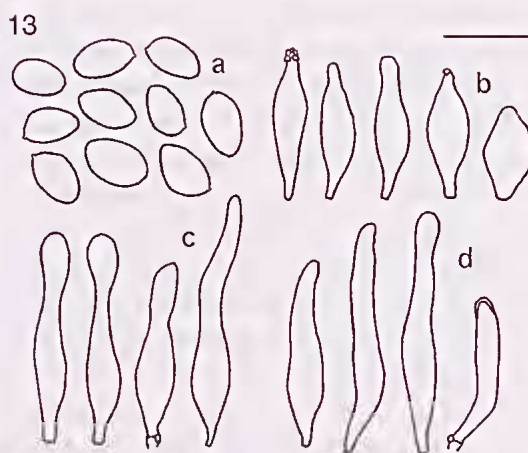


Figure 13: *Pholiota marangania* (AD12263, holotype of *Inocybe marangania*): a. spores; b. cheilocystidia; c. pleurocystidia; d. caulocystidia from stipe apex. Scale bar = $10 \mu\text{m}$ for spores, $25 \mu\text{m}$ for other cells.

bright ochraceous to hyaline or parts of the cells with ochraceous contents; bright tawny refractive hyphae frequent in stipe trama. *Lamellar trama* regular, pale yellowish in mass, hyphae cylindric, up to $16 \mu\text{m}$ diam. *Pileipellis* an ixocutis of loosely interwoven hyphae, these narrowly cylindric, $2.5\text{--}4.0 \mu\text{m}$ diam, often branching, ochraceous or yellowish to subhyaline, thin-walled; subpellis a bright ochraceous-tawny repent layer in mass, hyphae cylindric to inflated, $5\text{--}22 \mu\text{m}$ diam, incrustated with pigment. *Clamps* present.

Specimens examined: SOUTH AUSTRALIA. Holotype, Mt. Lofty Botanic Gardens below "Carmino", gregarious in troops among *Funaria*, 9.v.1984, C.A. Grgurinovic 2A584 & R.J. Chinnock (AD 12263).

Notes: The presence of a gelatinised pileipellis, an indistinct germ pore, and what appears to be growth on a charred substrate indicate *Inocybe marangania* is a species of *Pholiota*, likely related to the *P. highlandensis* group. Thus, the new combination is proposed: *Pholiota marangania* (Grgurinovic) Matheny & Bougher, comb. nov. *Inocybe marangania* Grgurinovic, *Larger Fungi of S. Austral.:* 179 (1997) (basionym).

***Inocybe striatula* (Cleland) Grgurinovic, Larger Fungi S. Austral.: 190 (1997)**

Cortinarius striatulus Cleland, *Trans. Roy. Soc. S. Austral.* 52: 221 (1928).

[Protologue] *Pileus* up to 1 in. (2.5 cm), somewhat convex to nearly plane, more or less gibbous, wavy on the margin, sometimes slightly repand, very finely fibrillose, submembranaceous, when moist striate at the periphery and between Russet and Cinnamon Brown (xv.), with a pale ring around the edge, when dry paler than Cinnamon Buff (xxix.). *Gills* sinuate, moderately close, slightly ventricose, near Sayal Brown (xxix.), with narrow finely serrate whitish edges. *Stem* 2 ins. (5 cm) high, moderately slender, a little flexuous, sometimes flattened, attenuated at the base and sometimes at the apex as well, fibrillose, markedly hollow, pallid, with a brownish tint above. Flesh pallid with a slight reddish-brown tint. Spores yellow-brown, oblique, $7.5 \times 4 \mu\text{m}$, subcaespitose amongst shrubs under Eucalypts. S.A.—Mt. Lofty, July 28, 1928.

Basidiospores $7.0\text{--}8.5 \times (4.0) 4.5\text{--}5.5 \mu\text{m}$ ($n=20$), faintly verrucose in Melzer's, elliptic to subamygdaliform with obtuse or bluntly pointed apices, germ pore absent; "Light Ochraceous Buff" or "Ochraceous Buff" in KOH, thick-walled, with a small but distinct apiculus, not reacting in Melzer's. *Basidia* $22\text{--}26 \times 6\text{--}7 \mu\text{m}$, 4-sterigmate, cylindrico-clavate to clavate, hyaline to ochraceous, many collapsed. *Pleurocystidia* none. *Cheilocystidia* not demonstrable with confidence. *Caulocystidia* absent, stipe surface with sparse layer of vestiture hyphae at apex down to the base, similar to suprapellis hyphae described below. *Lamellar trama* regular, "Ochraceous-Buff" to hyaline in mass, not brightly pigmented, hyphae cylindrical, up to $13 \mu\text{m}$ diam. *Pileipellis* with a suprapellis composed of an interwoven layer of narrowly cylindrical, smooth, thin-walled, hyaline hyphae, these up to $7.0 \mu\text{m}$ diam, mostly collapsed; subpellis, "Ochraceous-Tawny" pigmented and composed of mostly inflated hyphae, up to $27 \mu\text{m}$ diam, faintly incrustated. *Clamps* present.

Specimens examined: SOUTH AUSTRALIA. Holotype, Mt. Lofty, 28.vii.1928, J.B. Cleland (AD 4660); Waterfall Gully, 1.vii.1945, J.B. Cleland (AD 4656); Belair National Park, 11.viii.1945, J.B. Cleland (AD4655).

Notes: This is *Cortinarius striatulus* and should be recognised as such as originally proposed by Cleland. The spores are faintly verrucose, possess a distinct apiculus, and the holotype and other authentic materials display a *Telamonia*-like habit, including the downwards attenuated stipe and striate pileus carefully

emphasized in the protologue. Fresh material of what we interpret to represent this species (E6783 (=PBM 2137), PERTH, Plantagenet, 24 June 2001, P.B. Matheny) demonstrates the presence of globose, pyriform to subcylindric small cheilocystidia ($16\text{--}40 \times 15\text{--}24 \mu\text{m}$) and the other characters enumerated above.

***Inocybe victoriae* (Cooke & Massee) Sacc., Syll. Fung. 9: 101 (1891)**

Agaricus victoriae Cooke & Massee in Cooke, *Grevillea* 16: 72 (1888); *Hebeloma victoriae* (Cooke & Massee) Pegler, *Austral. J. Bot.* 13: 347 (1965)

Pegler (1965) transferred *Inocybe victoriae* to *Hebeloma* given the brown spores and gelatinized pileipellis. Horak (1980) commented on the poor condition of the type, and that it may represent a species of *Lepiota* given smooth, pale yellow, and slightly dextrinoid spores. We have no new information to report on this species, other than it should not be confused with *Hebeloma victoriense* A.A. Holland & Pegler.

Doubtful taxa

***Inocybe albidipes* Cleland & Cheel, Transactions of the Royal Society of South Australia 42: 107 (1918)**

The type specimens of *I. albidipes* have yet to be located although a watercolour is extant per Horak (1980). The protologue describes a species with nodulose spores, stipe with a swollen to marginate bulb, and light to yellowish-brown fibrillose and rimose pileus with an acute umbo when young. The stipe would be white given Cleland's choice of specific epithet. This description would suggest an affinity with north temperate taxa such as *I. mixtilis* (Britz.) Sacc. or *I. praetervis* Quél. Until we can examine the watercolour, we consider the species doubtful.

***Inocybe brunnea* K. Syme, Survey Larger Fungi Two Peoples Bay Nature Reserve 14 (1992), nom. inval., Art. 36.1**

The name appears in a report and is a *nomen nudum* with no Latin description (May and Wood 1997) or any accompanying description. The name should not be confused with *I. brunnea* Quél.

***Inocybe crassipes* (Cooke & Masee) Pegler,
Austr. J. Bot. 13: 342 (1965)**

Agaricus ozes var. *crassipes* Cooke & Mass., *Grevillea* 15: 93 (1887); *Collybia ozes* (Fr.) Quél. var. *crassipes* (Cooke & Mass.) Sacc., *Syll. Fung.* 9: 34 (1891)

Grgurinovic (1997) presents a statement made by Pegler (1965), who studied type material at Kew and considered the species in section *Rimosae*. We concur with Horak (1980) that *I. crassipes* is best regarded as doubtful given its fragmentary state and lack of data on cheilocystidia. The lead author was able to view a copy of a painting of the holotype of *Agaricus ozes* var. *crassipes* held at MEL. The icon features a pileus that is dark reddish brown, somewhat rimose with a few tears along the margin, more or less avellaneous to fawn coloured lamellae that are medium in breadth with darker pigmented edges, and a dark reddish brown stipe that is fibrillose-striate and enlarged towards the base. No other critical diagnostic features are discernible. In our opinion, it could be consistent with a member of section *Rimosae*, but the darker lamellar edges would be unusual for this group. The rather somber colours and darker lamellar edges could also point to *Auritella*, but without complete microscopic data, it is not possible to apply the name at this point.

***Inocybe subasterospora* Cleland & Cheel,
Trans. Roy. Soc. S. Aust. 42: 106 (1918)**

Type material was not located at AD. However, two watercolour icons are referenced in the protologue (below), which we have not seen. Cleland & Cheel (1918) state the species is common in the Sydney district, so it would seem likely material corresponding to the following description may be encountered:

[Description from protologue] Pileus occasionally up to 1 1/4 inch in diameter, slightly convex, sometimes depressed, subgibbous to occasionally papillately umbonate, dark brown, occasionally lighter or rusty-brown and often more chestnut at the periphery, usually fibrously streaked and splitting, occasionally more scaly. Gills adnate to adnexed, separating from the stem, moderately crowded, pale milk-coffee coloured, then cinnamon, sometimes with a white edge. Stem up to 1 1/2 inches high, moderately stout, solid, slightly fibrillose, pale brownish, slightly

mealy above, base sometimes a little swollen. Spores irregularly knobby, 7-9 × 5.2-7 μm. Cystidia numerous, ventricose, apices usually knobby, 42 × 17, 47 × 15.5, 50 × 14, 55 × 21.5, 70 × 17 μm, etc.

Sydney district, March to July, October, December; Pittwater, April, Parramatta, July; Milson Island, Hawkesbury River, July, November; Hill Top (E. C.), May; localities not noted (several); locality not stated (stem white but cap dark). (Miss Clarke, Watercolour No. 33; D.I.C., Watercolour No. 63; Herb., J.B.C., Form. Sp., November, 1914).

Acknowledgements

We thank the curators and staff, including volunteers, at Adelaide (AD), Perth (PERTH), and the National Herbarium of Victoria, Royal Botanic Gardens Melbourne (MEL) for providing type material. Graham Bell is especially thanked for his assistance. We also extend thanks to former staff at CSIRO in Perth, particularly Susan Nigg, Janine Catchpole, and Inez Tommerup, for facilitating a stay by PBM during 2001. Tom May and Teresa Lebel kindly hosted PBM during a visit to MEL in 2009. Travel to Australia in 2001 for Matheny was made possible by an anonymous gift to the Biology Department at the University of Washington. Travel to New Zealand and southeast Australia during 2009 was made possible by funds from the University of Tennessee. David Ratkowsky and Genevieve Gates kindly provided support and access to materials from Tasmania. We also appreciate the comments and reviews from two anonymous sources and Kevin Thiele, DEC, Perth.

References

- Bougher, N.L. and Syme, K. (1998). *Fungi of southern Australia*. University of Western Australia Press: Nedlands, Western Australia.
- Cleland, J.B. (1928). Australian fungi: notes and descriptions. –No. 7. *Transactions of the Royal Society of South Australia* 52, 217–222.
- Cleland, J.B. (1933). Australian fungi: notes and descriptions. –No. 9. *Transactions of the Royal Society of South Australia* 57, 187–194.
- Cleland, J.B. and Cheel, E. (1918). Australian fungi: notes and descriptions. No. 1. *Transactions of the Royal Society of South Australia* 42, 88–138.

- Garnica, S., Weiß, M., Oertel, B. and Oberwinkler, F. (2005). A framework for a phylogenetic classification in the genus *Cortinarius* (Basidiomycota, Agaricales) derived from morphological and molecular data. *Conadion Journal of Botany* **83**, 1457–1477.
- Gasparini, B. (2006) Renaming of three Australian *Cortinarius*. *Australasian Mycologist* **25**, 24–27.
- Grgurinovic, C.A. (1997). *Larger Fungi of South Australia*. The Botanic Gardens of Adelaide and State Herbarium and The Flora and Fauna of South Australia Handbooks Committee: Adelaide.
- Grgurinovic, C.A. (2002). Fungal names needing correction. *Australasian Mycologist* **21**, 35–37.
- Holmgren, P.K., Holmgren, N.H. and Barnett, L.C. (1990). *Index herboriorum*. 8th ed. New York Botanical Garden: New York.
- Horak, E. (1977). Fungi Agaricini Novaezelandiae. VI. *Inocybe* (Fr.) Fr. and *Astrosporino* Schroeter. *New Zealand Journal of Botany* **15**, 713–747.
- Horak, E. (1979). *Astrosporino* (Agaricales) in Indomalaya and Australasia. *Persoonia* **10**, 157–205.
- Horak, E. (1980). *Inocybe* (Agaricales) in Indomalaya and Australasia. *Persoonia* **11**, 1–37.
- Horak, E. (1981). On Himalayan species of *Astrosporino* and *Inocybe* (Agaricales). *Persoonia* **11**, 303–310.
- Kuyper, T.W. (1986). A revision of the genus *Inocybe* in Europe: I. subgenus *Inosperma* and the smooth-spored species of subgenus *Inocybe*. *Persoonia* **3**(Suppl.), 1–247.
- Matheny, P.B. and Ammirati, J.F. (2003). *Inocybe ongustispora*, *I. toedophilo*, and *Cortinarius oureifolius*: an unusual inocyboid *Cortinarius*. *Mycotoxon* **88**, 401–407.
- Matheny, P.B. (2005). Improving phylogenetic inference of mushrooms with RPB1 and RPB2 nucleotide sequences (*Inocybe*; Agaricales). *Molecular Phylogenetics and Evolution* **35**, 1–20.
- Matheny, P.B. and Bougher, N.L. (2005). A new violet species of *Inocybe* (Agaricales) from urban and rural landscapes in Western Australia. *Australasian Mycologist* **24**, 7–12.
- Matheny, P.B. and Bougher, N.L. (2006a). The new genus *Auritello* from Africa and Australia (Inocybaceae, Agaricales): molecular systematics, taxonomy and historical biogeography. *Mycological Progress* **5**, 2–17.
- Matheny, P.B. and Bougher, N.L. (2006b). Validation of *Auritello* (Inocybaceae, Agaricales). *Mycotoxon* **97**, 231–233.
- Matheny, P.B., Aime, M.C., Bougher, N.L., Buyck, B., Desjardin D.E., Horak, E., Kropp, B.R., Lodge, D.J., Trappe, J.M. and Hibbett, D.S. (2009). Out of the palaeotropics? Historical biogeography and diversification of the cosmopolitan mushroom family Inocybaceae. *Journal of Biogeography* **36**, 577–592.
- May, T.W. and Wood, A.E. (1997) *Fungi of Australia*. Volume 2A. Australian Biological Resources Study: Canberra.
- Miller, O.K., Jr. and Hilton, R.N. (1987). New and interesting agarics from Western Australia. *Sydowia* **39**, 126–137.
- 'Munsell Soil Color Charts' (1954). Munsell Color Company: Baltimore, Maryland.
- Ridgway, R. (1912). *Color standards and color nomenclature*. Published by the author: Washington D. C.
- Ryberg, M. (2009). *An evolutionary view of the taxonomy and ecology of Inocybe (Agaricales)*. PhD thesis, Department of Plant and Environmental Sciences, University of Gothenburg: Sweden.